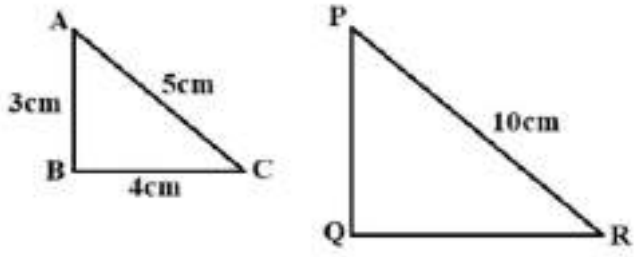
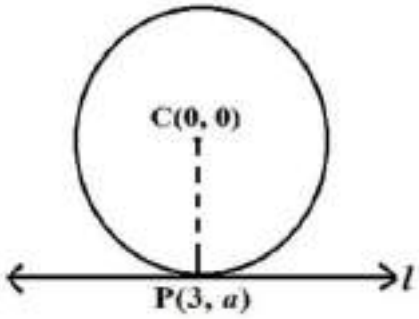
	KENDRIYA VIDYALAYA SANGATHAN, MUMBAI REGION **SESSION: 2025 - 26** **PREBOARD I EXAMINATION** **MATHEMATICS (BASIC) – Code No. 241** **CLASS - X** **Time Allowed: 3 Hrs** **Maximum Marks: 80** **General Instructions:** **This Question Paper consist of 38 questions divided into 5 Sections A, B, C, D, and E.** **Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.** **Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.** **Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.** **Section D has 4 Long Answer (LA) type questions carrying 5 marks each.** **Section E has 3 sourced based/Case Based/passage based/integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.** **All Questions are compulsory. However internal choice has been provided in each section except section A.** **Draw neat figures wherever required. Take π =22/7 wherever required if not stated.**	
	SECTION -A	
1	The LCM of two numbers is 182 and their HCF is 13. If one of the numbers is 26, the other number is. (a)84 (b) 90 (c) 81 (d) 91	1
2	Find the quadratic polynomial whose sum and product of zeroes are 0 and $\sqrt{5}$ respectively. (a) $x^2 - \sqrt{5}x$ (b) $x^2 - 6$ (c) $x^2 - \sqrt{5}$, (d) $x^2 + \sqrt{5}$	1
3	The system of equations k x - y = 2 and 6x -2y = 3 has a unique solution when: (a) k = 0 (b) $k \neq 0$ (c) k = 3 (d) $k \neq 3$	1
4	If one root of the quadratic equation $2x^2 + kx - 6 = 0$ is 2, the value of k is (a) 1 (b) -1 (c) 2 (d) -2	1
5	In an AP, if d = -4, n = 7, a_n = 4, then a is (a) 6 (b) 7 (c) 20 (d) 28	1
6	If k-1, k+3 and 3k-1 are in AP, then find the value of k (a) 4 (b) 5 (c) 3 (d) 7	1
7	The x- axis divides the join of P(2, −3) and Q(5, 6) in the ratio: (a) 2 : 3 (b) 1 : 2 (c) 2 : 1 (d) 3 : 5	1
8	Which of the following is NOT a similarity criterion of triangles? (a) AA (b) SAS (c) AAA (d) RHS	1
9	Find the coordinates of the centre of the circle where coordinates of the ends of the	1

	diameter are (a,b) and (-a,-b) (a)(0,0) (b) (a,b) (c) (-a,-b) (d) (a/2,b/2)	
10	If ΔABC~ΔPQR, then perimeter of the triangle PQR (in cm) is (a) 12 cm (b) 24 cm (c) 18 cm (d)20 cm  	1
11	If the angle between two radii of a circle is 110º, then the angle between the tangents at the ends of the radii is: (a) 90^0 (b) 50^0 (c) 70^0 (c) 40^0	1
12	$(1 – \sin^2 A)$ is equal to a) $\cos^2 A$ b) $\tan^2 A$ c) $1 – \sin^2 A$ d) $\sec^2 A$	1
13	The length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm is (a) 10 cm (b) 5 cm (c) 7 cm (d) $2\sqrt{7}$ cm	1
14	Consider the following frequency distribution Class: 5-15 | 15-25 | 25-35 | 35-45 | 45-55 | 55-65 frequency: 6 | 11 | 21 | 23 | 14 | 5 The upper limit of modal class is: (a) 23 (b) 35 (c) 45 (d) 80	1
15	Find the area of a sector of circle of radius 21 cm and central angle 120°. (a) 441 cm^2 (b) 462 cm^2 (c) 386 cm^2 (d) 512 cm^2	1
16	If tan x = 1, then what is the value of x (a) 30° (b) 45° (c) 60° (d) 90°	1
17	The relationship between mean, median and mode for a moderately skewed distribution is (a) mode = median – 2 mean (b) mode = 3 median – 2 mean (c) mode = 2 median – 3 mean (d) mode = median – mean	1
18	**The probability that cannot exist among the following:** (a) ⅔ (b) -1.5 (c) 15% (d) 0.7	**1**
	DIRECTION: In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option (a) Both **assertion (A)** and reason (R) are true and reason (R) is the correct explanation of **assertion (A)** (b) Both **assertion (A)** and **reason (R)** are true but reason (R) is not the correct explanation of **assertion (A).** (c) **Assertions (A)** is true but **reason (R)** is false. (d) **Assertions (A)** is false but **reason (R)** is true.	
19.	**Assertion (A):** Line joining the midpoints of two sides of triangle is parallel to the third	**1**

	side. **Reason(R):** If a line divides two sides of a triangle in the same ratio then it is parallel to the third side.	
20	**Assertion (A):** The sum of probabilities of all possible outcomes of a random experiment is 1. **Reason(R):** The probability of an impossible event is 0.	**1**
	SECTION -B	
21	Three bells ring at intervals of 6, 8, and 12 minutes. If they ring together at 7:00 AM, when will they next ring together? OR The sum of two numbers is 90 and their LCM is 60. If one number is 30, find the other number and the HCF of these numbers.	2
22	Find the radius of the circle with centre at origin, if line L given by $x+y = 5$ is tangent to the circle at point P(3,a) 	2
23	If 4 tan θ = 3, then evaluate : $\frac{(4\sin\theta - \cos\theta)}{(4\sin\theta + \cos\theta)}$ **OR** Evaluate: $\sin^2 60^\circ + 2\tan 45^\circ - \cos^2 30^\circ$.	2
24	If α and β are zeroes of the polynomial $2x^2 - 5x + 7$, then find the value of $\alpha^{-1} + \beta^{-1}$.	2
25	The sum of two numbers is 27 and their product is 182. Find the numbers using a quadratic equation.	2
	SECTION -C	
26	Prove that $3-2\sqrt{2}$ is an irrational number, given that $\sqrt{2}$ is irrational	3
27	The sum of first n terms of an AP is $5\boldsymbol{n}^2 - \boldsymbol{n}$. Find the1st, 2nd, 10th and nth term of the AP.	3
28	Two friends, Riya and Meena, are planning to buy notebooks and pens for an NGO. Riya buys 4 notebooks and 6 pens for ₹ 72. Meena buys 2 notebooks and 4 pens for ₹ 40. (i) Represent the situation algebraically. (ii) Find the cost of one notebook and one pen using graphical method. **OR** The sum of the digits of a two-digit number is 9. If 27 is added to the number, the digits interchange their places. Find the number.	3
29	Prove that: $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$	3
30	Show that parallelogram circumscribing a circle is a rhombus.	3
31	If the median of the following frequency distribution is 35, find the value of k.	3

Class int	**20-25**	**25-30**	**30-35**	**35-40**	**40-45**	**45-50**

frequency	**2**	**5**	**8**	**K**	**4**	**5**

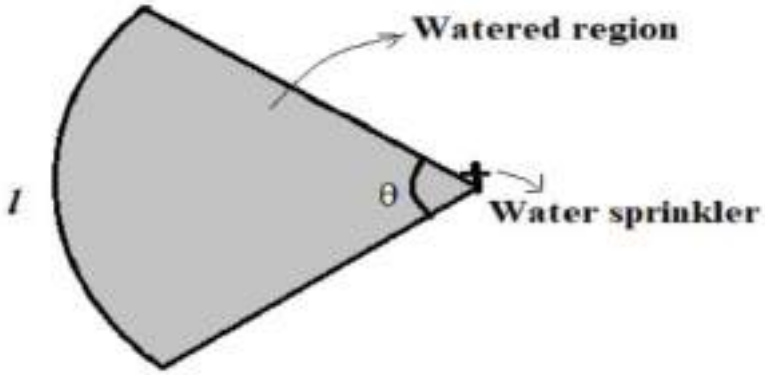
OR

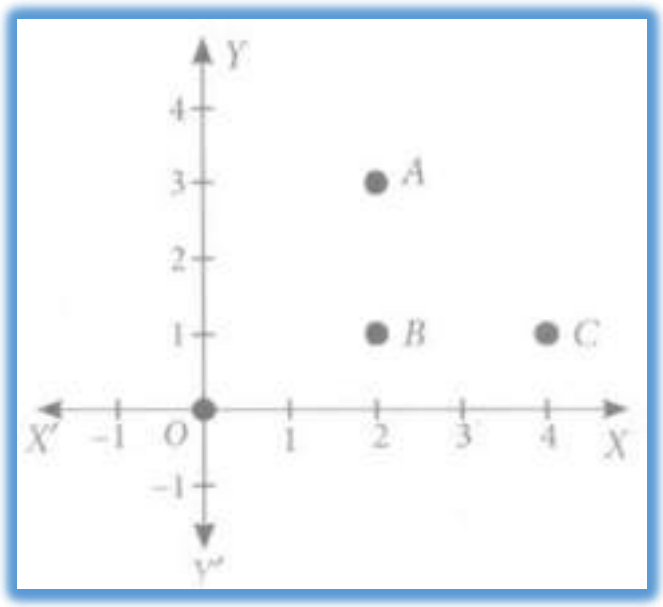
The following data gives the heights of students of a class:

No. of students	**160-165**	**165-170**	**170-175**	**175-180**	**180-185**
Y	**5**	**10**	**20**	**10**	**5**

Find the mode of the data.

	SECTION -D	
32	State and prove Basic Proportionality theorem.	5
33	A train travels 360km at a uniform speed. If the speed had been 5km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train. **OR** A rectangular park is 60 m long and 40 m wide. A path of uniform width runs around the park inside it. The area of the path is 384 m^2. Find the width of the park	5
34	A hemispherical depression is cut out from one face of a wooden cylinder of radius 7 cm and height 10 cm. Find the total surface area of the remaining solid. Also find the amount of wood remaining in the solid.	5
35	The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, find the height of the building. OR The angle of depression of the top and bottom of a building from the top of a 40 m high tower are found to be 30° and 45° respectively. Find the horizontal distance between the building and tower and the height of building.	5
	SECTION -E	
36	A group of students conducted a survey to find out about the preferred mode of transportation to school among their classmates. They surveyed 200 students from their school. The results of the survey are as follows: 120 students preferred to walk to school. 25% of the students preferred to use bicycles. 10% of the students preferred to take the bus. Remaining students preferred to be dropped off by car. Based on the above information, answer the following questions:	
i	What is the probability that a randomly selected student does not prefer to walk to school?	1
ii	Find the probability of a randomly selected student who prefers to walk or use a bicycle.	1
iii	One day 50% of walking students decided to come by bicycle. What is the probability that a randomly selected student comes to school using a bicycle on that day? OR What is the probability that a randomly selected student prefers to be dropped off by car?	2
37	A water sprinkler is a device used to irrigate agricultural crops, lawns, landscapes, golf courses, and other areas. Water sprinklers can be used for residential, industrial, and agricultural usage	

	 A water sprinkler is set to shoot a stream of water a distance of 21 m and rotate through an angle which is equal to complementary angle of 10°. 	
i	What is the area of sector in terms of arc length?	1
ii	What is the area of the watered region (in terms of π)?	1
iii	If the radius(r) changes to 28m, find the angle θ so that the area of the watered region remains the same. OR If the radius(r) is increased from 21m to 28m and the angle remains the same, what is the increase in the area of the watered region	2
38	Alia and Shagun are friends living on the same street in Patel Nagar. Shagun's house is at the intersection of one street with another street on which there is a library. They both study in the same school and that is not far from Shagun's house. Suppose the school is situated at the point O, i.e., the origin, Alia's house is at A. Shagun's house is at B and library is at C. Based on the above information, answer the following questions.	

		
i	How far is Alia's house from Shagun's house?	1
ii	How far is the library from Shagun's house?	1
iii	Show that for Shagun, school is farther compared to Alia's house and library. **OR** Show that Alia's house, shagun's house and library form an isosceles right triangle.	2